

## MTC200 Fast NC Inputs/Outputs 21VRS

Functional Description

SYSTEM200

<b>Title</b>	MTC200 Fast NC Inputs/Outputs 21VRS
<b>Type of Documentation</b>	Functional Description
<b>Document Typecode</b>	DOK-MTC200-FAST*IO*V21-FK01-EN-P
<b>Internal File Reference</b>	Document Number 120-1700-B375-01/EN
<b>Purpose of Documentation</b>	This documentation describes the function "Fast NC Inputs/Outputs" which is valid from version 21VRS onwards.

**Record of Revisions**

Description	Release Date	Notes
120-1700-B375-01/EN	04.02	First Issue

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# 1 Overview

## 1.1 Function

The “Fast NC inputs/outputs” function permits direct and quick activation of the PLC I/O level from the NC program.

## 1.2 Access

The PLC I/O level is accessed via the “peripheral events” (P-events). Altogether, 32 outputs and 32 inputs are available.



## 2 Fast NC Inputs/Outputs

Using the "Fast NC inputs/outputs" function, the PLC I/O level can be addressed directly from the NC program. 32 outputs (4 bytes) and 32 inputs (4 bytes) are available, which are set and read by means of peripheral events (P-events).

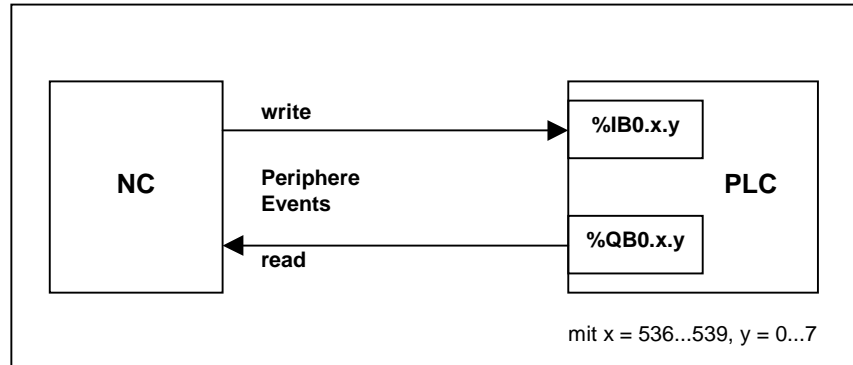


Fig. 2-1: Transmission of peripheral events from the NC to the PLC





### 3 Peripheral Events

**P Events** The peripheral events provide 32 outputs and 32 inputs, which are exchanged with the PLC at 2-ms intervals. These events are mapped to a physical input and output range of the PLC. The peripheral inputs %IB0.x.y<sup>1</sup> of the PLC are set by the writing event functions. The peripheral outputs %QB0.x.y<sup>1</sup> of the PLC are evaluated by the reading event functions.

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**Note:** Please note that the peripheral events are mapped to a separate input and output range. This means that any set output P-event cannot be read back automatically as an input P-event. Hence, the behavior of the P-events is different from that of the normal process events.

**Writing Functions** The writing functions are as follows:

SE P:<Ev.-No.>, RE P:<Ev.-No.>, EVENT(P,<Ev.-No.>)=...

The following table shows how the events to be written are assigned to the inputs in the PLC:

Address	Event number
%IB0.539.0 ... %IB0.539.7	0, 1, 2, 3, 4, 5, 6, 7
%IB0.538.0 ... %IB0.538.7	8, 9, 10, 11, 12, 13, 14, 15
%IB0.537.0 ... %IB0.537.7	16, 17, 18, 19, 20, 21, 22, 23
%IB0.536.0 ... %IB0.536.7	24, 25, 26, 27, 28, 29, 30, 31

Fig. 3-1: PLC input addresses of the events to be set

**Reading Functions** The reading functions are as follows:

WES P:<Ev.-No.>, WER P:<Ev.-No.>

BES .LABEL P:<Ev.-No.>, BER .LABEL P:<Ev.-No.>

The following table shows how the PLC outputs are assigned to the events to be read:

Address	Event number
%QB0.539.0 ... %QB0.539.7	0, 1, 2, 3, 4, 5, 6, 7
%QB0.538.0 ... %QB0.538.7	8, 9, 10, 11, 12, 13, 14, 15
%QB0.537.0 ... %QB0.537.7	16, 17, 18, 19, 20, 21, 22, 23
%QB0.536.0 ... %QB0.536.7	24, 25, 26, 27, 28, 29, 30, 31

Fig. 3-2: PLC output addresses of the events to be read

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<sup>1</sup> with x = 536....539, y = 0...7



## 4 Reading and Writing of Peripheral Events

### 4.1 Reading P-Event(s) to a Variable

The NC command <Variable\_EVENT(P,<event number>) can be used to read an event (or all of the events) to a variable. The function delivers 1.0 for a set event and 0.0 for a cleared event. If all events are addressed with \*, the function delivers the binary value across all set events (  $event_0 * 2^0 + \dots + event_{31} * 2^{31}$  ). The result of this function must be filed in a variable and may not be linked to any operations.

**Syntax** @<Variable>=EVENT(P,<event no.0..31>|\*expression)

- @2=EVENT(P,\*) ; @2=5.0 (event 0 and 2), if the peripheral  
; outputs %QB0.539.0 and % QB0.539.2  
; are set.

### 4.2 Writing P Event(s)

Using the NC command EVENT(P,<event number>)=expression, one event or all events can be written. Only the whole-number or rounded contents of the expression (examples: 5.54 is rounded off to 6; 3.14 is rounded off to 3) are taken into consideration. The function sets an event if the expression is unequal to 0, and it clears an event if the expression is equal to 0. If all events are addressed with \*, the function writes the whole-number content of the expression as binary value (32-bit) to the appropriate events (  $event_0 * 2^0 + \dots + event_{31} * 2^{31}$  ).

**Syntax** @<Variable>=EVENT(P,<event no.0..31>|\*expression)

- EVENT(P,\*)=@2 ; @2=5 (event 0 and 2) sets the peripheral  
; inputs %IB0.539.0 and % IBP0.539.2

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**Note:** Please refer to the NC Programming Instruction for more detailed information on the events.



## 5 Transmission Times for Peripheral Events

### 5.1 Influencing Variables

The transmission time of an I/O signal from the NC to the PLC and back (= running time of peripheral events) depends on various influencing variables:

#### PLC Cycle Time

Essentially, the transmission time of I/O signals are determined by the PLC cycle time. The shorter the PLC cycle time, the faster the transmission of the peripheral events. As compared with the standard PLC implementation (typical PLC cycle times are between 20 and 100 msec), the transmission can be significantly accelerated by using the corresponding fast PLC task (e.g. 2 or 4 msec).

#### Processing in the PLC Program

It makes a difference, whether the peripheral event is processed only logically in the PLC program or whether, for instance, peripheral PLC inputs/outputs are activated via the Interbus. Of course, the activation of physically available inputs/outputs via a field bus takes markedly longer than when the P-events are merely logically processed in the PLC program.

#### NC Record Cycle Time

The NC record cycle time also affects the transmission speed of the peripheral events. Depending on how the NC records for writing and reading the peripheral events are programmed, processing on the part of the NC takes at least 4 msec or, as a maximum, twice the NC record cycle time.



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- per Fax: **+49 (0) 9352 40 49 41**
- per e-Mail: **[service@indramat.de](mailto:service@indramat.de)**

Our service helpdesk at our headquarters in Lohr am Main, Germany can assist you in all kinds of inquiries. Contact us

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### 7.4 Vor der Kontaktaufnahme... - Before contacting us...

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1. detaillierte Beschreibung der Störung und der Umstände.
2. Angaben auf dem Typenschild der betreffenden Produkte, insbesondere Typenschlüssel und Seriennummern.
3. Tel./Faxnummern und e-Mail-Adresse, unter denen Sie für Rückfragen zu erreichen sind.

For quick and efficient help, please have the following information ready:

1. Detailed description of the failure and circumstances.
2. Information on the type plate of the affected products, especially type codes and serial numbers.
3. Your phone/fax numbers and e-mail address, so we can contact you in case of questions.

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